# Training and Education for Network Centric Warfare: Issues for New Zealand's Defence Force.

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# Abstract

The concept of Network Centric Warfare (NCW) is viewed as the next revolution in military affairs. Its introduction globally will necessarily affect the way the New Zealand Armed Forces operates in future conflicts. With the increasing use of digital technology in the military environment the need for and degree of increasing knowledge of Network Centric Warfare and its concepts must be explored. This country will have to combine its own definition and understanding of NCW into the framework of its Armed Force if it wants to continue to remain interoperable with technologically advance coalition forces.

This thesis looks into the issues and solutions which have been considered by other countries in their attempts to implement the NCW concept. It examines in detail how issues and solutions could be applied to New Zealand's attempt at NCW.

Chapters One and Two define the academic processes which have been used in this study. They also give a brief introduction to the broad idea of Network Centric Warfare and its origins.

Chapter Three examines in detail the complex evolution of the concept of Network Centric Warfare to its present state. In particular, it looks at how the events of September 11th 2001 have redefined warfare and the impact of that revolution on the traditional NCW concept. This chapter also focuses on the advantages and disadvantages of NCW which have now been proven through the experiences of Operation Enduring Freedom and Operation Iraqi Freedom. These two conflicts have been described as the first information technology wars of the 21st century.

Chapter Four focuses on how the concept of Network Centric Warfare has and will affect the specifics of personnel and make-up of the New Zealand Defence Force, as it makes the transition from a Platform Centric to a Network Centric approach in warfare. The special focus in this chapter is on

the New Zealand Army. The concepts of the ethos and cultural identity of a force are introduced here, with a view to revealing the influences that the adaptation of NCW methods and techniques can have on the organisation of that force. The discussion concludes that the introduction of NCW can have profound and permanent effect on a force's ethos and identity. This chapter also considers the influence of technology can help in the recruitment and retention of highly skilled people in the Army.

Chapter Five shows how the adoption of the concept of Network Centric Warfare also has the potential to fundamentally change the way in which higher level policy and doctrine are introduced and modified in the Armed Forces. This chapter looks at how future infrastructure and policies will need to have increased flexibility built into them from the start in order to embrace the demands of NCW for rapid developments in information technology and force-wide diffusion of such developments.

Chapter Six discusses a third important consequence of adopting the concept of Network Centric Warfare. Namely, how the introduction of NCW will affect both training and education of service personnel. In particular, it examines how the change from Platform Centric to Network Centric forms of warfare puts changing demands on the skill sets and needs required of service personnel. Examples are given of the new skill sets need in order for them to work effectively in a NCW environment.

Chapter Seven discusses the formation of a new training branch of service which will need to be set up to accommodate the new methods and skills that NCW brings to the battlefield. Included in this chapter are the imperatives of Information Warfare, Electronic Warfare, and Computer Network Operations for such a branch. Alongside Air, Land, Sea and Space NCW brings with it the creation of a fifth battle space. This battle-space is Cyberspace which encompasses the electromagnetic sphere, the Internet and all manner of Wide and Local Area Networks (WANs and LANs).

Chapter Eight returns to the issue of training and education introduced in Chapter Six, but focuses specifically on the use of simulation techniques and technologies. Such techniques will be required in order to help train soldiers to work effectively and efficiently under NCW. Why other training methods won't work well given an NCW environment, and why simulation technologies will work, is explained with examples of each. This chapter argues in particular that simulation provides the most effective training in the unified data architecture that will be needed to provide cross platform capability and inter and intra service solutions in Network Centric Warfare. Examples of data solutions are provided to help explain the underlying simulation concepts and methods.

Chapter Nine is the conclusion of this study. It reviews the results of this thesis and provides recommendations on the implementation of the Network Centric Warfare environment required in the New Zealand Armed Forces.

# Preface and Acknowledgements

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# Tables and Figures

# Abbreviations

| | |
|---|---|
| **2D** | Two Dimensional |
| **3D** | Three Dimensional |
| **AAR** | After Action Review / Report |
| **AARC** | All Arms Recruit Course |
| **ABCA** | Australia, Britain, Canada, America |
| **ACR** | Army Capability Review |
| **ADF** | Australian Defence Force |
| **AI** | Artificial Intelligence |
| **AKO** | Army Knowledge Online |
| **AOR** | Area Of Responsibility |
| **ATP** | Army Transformation Program |
| **AW** | Asymmetrical Warfare |
| **BBS** | Bulletin Board Service |
| **BFT** | Blue Force Tracker |
| **BOS** | Battlefield Operating System |
| **C2** | Command and Control |
| **C3** | Command, Control, Communications |
| **C4** | Command, Control, Communications, Computers |
| **C4ISR** | Command, Control, Communications, Computers, Intelligence, Surveillance and Reconnaissance |
| **CDA** | Command Data Assistant |
| **CIS** | Communications Information Service |
| **CNO** | Computer Network Operations |
| **COA** | Course of Action |
| **CROP** | Common Relevant Operation Picture |
| **CSS** | Combat Service Support |
| **CWID** | Coalition Warrior Interoperability Demonstration |
| **DARPA** | Defense Advance Research Projects Agency |
| **DSTO** | Defence Science and Technology Office |
| **DCARR** | Defence Capability and Resource Review |
| **DIS** | Distributed Interactive Systems |
| **DOD** | Department of Defense |
| **DSI** | Defence Sustainability Initiative |
| **DT** | Digital Technology |
| **EW** | Electronic Warfare |
| **FBCB2** | Force XXI Battle Command Brigade and Below |
| **FLOC** | Future Land Operations Capability |
| **FOM** | Federated Object Model |
| **FPS** | First Person Shooter |
| **FSC** | Full Spectrum Command |
| **FSW** | Full Spectrum Warrior |
| **GIG** | Global Information Grid |
| **GPS** | Global Positioning System |
| **HLA** | High Level Architecture. |
| **HSS** | Health Service Support |
| **HVT** | High Value Target |
| **IA** | Information Assurance |
| **ICT** | Information Communication Technology |
| **IED** | Improvised Explosive Device |

| | |
|---|---|
| **IEEE** | Institute of Electrical and Electronics Engineers |
| **IP** | Internet Protocol |
| **IPX/SPX** | Internet Packet eXchange / Sequential Packet eXchange |
| **IO** | Information Operations |
| **IO** | Information Overload |
| **IST** | Information Systems Technology |
| **IT** | Information Technology |
| **IW** | Information Warfare |
| **JCCS** | Joint Command and Control System |
| **JCIS** | Joint Communication Information Systems |
| **LAN** | Local Area Network |
| **LAV** | Light Armoured Vehicle |
| **LOV** | Light Operational Vehicle |
| **NCE** | Network Centric Enterprise |
| **NCO** | Network Centric Operations |
| **NCO** | Non Commissioned Officer |
| **NCW** | Network Centric Warfare |
| **NEA** | Network Enabled Army |
| **NEO** | Network Enabled Operations |
| **NET** | New Equipment Training |
| **NZA** | New Zealand Army |
| **NZASC** | New Zealand Army Simulation Centre |
| **NZDF** | New Zealand Defence Force |
| **MEUSOC** | Marine Expeditionary Unit Special Operations Capable |
| **MMORPG** | Massively Multiplayer Online Role Playing Game |
| **MS** | Microsoft |
| **OEF** | Operation Enduring Freedom |
| **OIF** | Operation Iraqi Freedom |
| **OPFOR** | Opposition Force |
| **OODA** | Observe, Orientate, Decide, Act |
| **PC** | Personal Computer |
| **PDA** | Personal Data Assistant |
| **RF** | Regular Force |
| **RMA** | Revolution in Military Affairs |
| **RNZAF** | Royal New Zealand Air Force |
| **RNZN** | Royal New Zealand Navy |
| **ROE** | Rules of Engagement |
| **RTS** | Real Time Strategy |
| **SF** | Special Forces |
| **SNCO** | Senior Non Commissioned Officer |
| **SOM** | Simulation Object Model |
| **SOP** | Standard Operating Picture |
| **TCP/IP** | Transmission Control Protocol/ Internet Protocol |
| **TERCOM** | Terrain Contour Matching |
| **TF** | Territorial Force |
| **TOC** | Tactical Operations Centre |
| **UAV** | Unmanned Aerial Vehicle |
| **UCAV** | Unmanned Combat Aerial Vehicle |
| **USARI** | United States Army Research Institute |
| **VR** | Virtual Reality |
| **WTS** | Weapon Training System |

# Chapter One

# Introduction: Network Centric Warfare and New Zealand

Many nations today would like to be able to enhance the capabilities of their armed forces without the need to purchase more equipment or expand the number of troops they have. Indeed, throughout history tacticians and strategists have always been trying to think of ways to project superior firepower against a numerically superior force without being required to field a force of equal numbers. Success has mostly come from the introduction of new technology and new concepts of war to the battlefield. From the spear to the catapult to the airplane, these systems have tried to increase the firepower being able to be delivered without risking soldiers' lives. The present day New Zealand Defence Force is no exception to the need for such innovation and invention.

The New Zealand Army and the New Zealand Defence Force are currently going through a transitional period in their development. With the introduction of the Defence Capability and Resource Review (DCARR) and the Defence Sustainability Initiative (DSI), the New Zealand Government is increasing the resources available to the Defence Force. These resources are targeted to regenerate and expand abilities and capabilities that have atrophied due to lower funding levels from previous governments. This development is providing the right environment for the New Zealand Army to invest in military

digital technologies and thereby catch up to international levels in Network Centric Warfare (NCW).

The New Zealand Army's efforts are guided by the Networked Enabled Army (NEA) programme. Three categories of investment are specified in this programme. (1) Investments in modern digital technologies; such as data networks, these include Internet, Intranet, Terrestrial Cable Networks plus Wireless and Satellite networks. (2) Investments in the Information Communication Technologies; these include IPv4, IPv6, TCP/IP, IPX / SPX. (3) Investments in Information Systems; these comprise Personal Computers, Personal Data Assistance, Inter vehicle Information Systems. These three categories are used to integrate individual units, weapons systems and weapon platforms that generate faster operational tempo and superior firepower for soldiers on operations.

These results come through the application of superior situational awareness on the battlefield which is made possible by such integrated digital technologies. Indeed, the very expression "I know where I am, I know where my units are and I know where the enemy is" is derived from integrated digital technologies. Given them, War Fighters have the ability to call on increased firepower from non-organic assets, assets which do not belong to or are not under the command of a selected unit, via the NCW systems.

Network Centric Warfare is not just about enhancing the capability of a particular weapons platform or system, however. Nor is it just about applying enhanced firepower from many sources to a combat situation. It is as much about the support structures that are used to keep a force moving, supplied and educated. NCW is a whole system approach and can have influence on the whole military process from training, deployment, engagement, and retrieval all the way to future policy and doctrine.

One of the key areas for the implementation of digital technology and of the NEA is in training and education. New skill sets have been identified by international NCW research; these are the skill sets which would need to be

introduced to the New Zealand Army training system if the Army wants to remain interoperable with coalition allies already proficient in NCW. New Zealand Army doctrine and Joint Force doctrine may also need to be reconsidered or remoulded in order to make available the full effects that Network Centric Warfare and Network Enabled Operations (NEO) can achieve. Such changes in training and doctrine will lead to soldiers being fully trained in digital technology methods and equipment.

Even if the New Zealand Defence Force decides that it does not want to engage in a complete conversion to Network Centric Warfare, there still needs to be an awareness of its capabilities within the NZDF. This is so because otherwise no effective defence can be maintained against external NCW threats nor modern subversive threats within New Zealand. For example, the NCW concept links the Armed Forces with both the commercial and private sectors via its integrated logistics and supply system; whatever direction the NZDF takes, these digital lines of communication and supply will have to be protected in any future conflicts just like any other physical supply line.

Network Centric Warfare can be a great benefit to the New Zealand Defence Force. Its implementation and management will take time and resources, and there are huge issues and pitfalls ahead for this concept in New Zealand. However, its implementation has the potential to produce a world-class force equal in ability to any in the world.